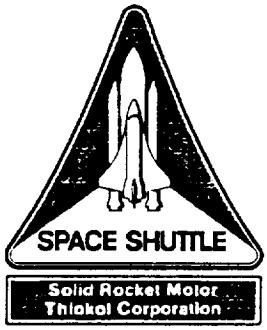

Appendix B
Case, Seals, and Joints PFORs

Final Postflight Hardware Evaluation Report RSRM-29 (STS-54)

September 1993

Prepared for:

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
GEORGE C. MARSHALL SPACE FLIGHT CENTER
MARSHALL SPACE FLIGHT CENTER, ALABAMA 35812

Contract No.	NAS8-38100
DR No.	4-23
WBS No.	4C601-04-01
ECS No.	SS4772

Thiokol CORPORATION
SPACE OPERATIONS

P.O. Box 707, Brigham City, Utah 84302-0707 (801) 863-3511

CASE, SEALS, AND JOINTS REQUIRED PFOR LIST

PFOR #	Title	Side	Joint or Location	Final Report Page Number
B-2	S&A Device (Barrier-Booster and Environmental Seal Region) Condition	Left	S&A	B-1
B-7	S&A Rotor Shaft O-ring Condition (Detailed)	Left	S&A	B-2
B-1	Leak Check Plug/SII and Port Condition (At Removal)	Left	S&A 126°	B-3
B-4	Leak Check Plug/SII Condition (Detailed)	Left	S&A 126°	B-4
B-6	Small Diameter (Leak Check Plug/SII) O-ring Condition (Detailed)	Left	S&A 126°	B-5
B-1	Leak Check Plug/SII and Port Condition (At Removal)	Left	18° SII	B-6
B-4	Leak Check Plug/SII Condition (Detailed)	Left	18° SII	B-7
B-6	Small Diameter (Leak Check Plug/SII) O-ring Condition (Detailed)	Left	18° SII	B-8
B-1	Leak Check Plug/SII and Port Condition (At Removal)	Left	198° SII	B-9
B-4	Leak Check Plug/SII Condition (Detailed)	Left	198° SII	B-10
B-6	Small Diameter (Leak Check Plug/SII) O-ring Condition (Detailed)	Left	198° SII	B-11

(Note: Clarification forms will be inserted after the required PFOR in the Final Report. The clarification form page number will be the same as the required PFOR Final Report page number appended by a sequential alphabetic extension.)

CASE, SEALS, AND JOINTS REQUIRED LIST (Cont.)

PFOR #	Title	Side	Joint or Location	Final Report Page Number
B-3	Internal Nozzle Joint Condition	Left	Nozzle Joint #2	B-12
B-5	Large Diameter (Joint) O-ring Condition (Detailed)	Left	Nozzle Joint #2	B-13
B-1	Leak Check Plug/SII and Port Condition (At Removal)	Left	Nozzle Joint #2	B-14
B-4	Leak Check Plug/SII Condition (Detailed)	Left	Nozzle Joint #2	B-15
B-6	Small Diameter (Leak Check Plug/SII) O-ring Condition (Detailed)	Left	Nozzle Joint #2	B-16
B-3	Internal Nozzle Joint Condition	Left	Nozzle Joint #3	B-17
B-5	Large Diameter (Joint) O-ring Condition (Detailed)	Left	Nozzle Joint #3	B-18
B-1	Leak Check Plug/SII and Port Condition (At Removal)	Left	Nozzle Joint #3	B-19
B-4	Leak Check Plug/SII Condition (Detailed)	Left	Nozzle Joint #3	B-20
B-6	Small Diameter (Leak Check Plug/SII) O-ring Condition (Detailed)	Left	Nozzle Joint #3	B-21
B-3	Internal Nozzle Joint Condition	Left	Nozzle Joint #4	B-22
B-5	Large Diameter (Joint) O-ring Condition (Detailed)	Left	Nozzle Joint #4	B-23
B-1	Leak Check Plug/SII and Port Condition (At Removal)	Left	Nozzle Joint #4	B-24
B-4	Leak Check Plug/SII Condition (Detailed)	Left	Nozzle Joint #4	B-25
B-6	Small Diameter (Leak Check Plug/SII) O-ring Condition (Detailed)	Left	Nozzle Joint #4	B-26

(Note: Clarification forms will be inserted after the required PFOR in the Final Report. The clarification form page number will be the same as the required PFOR Final Report page number appended by a sequential alphabetic extension.)

CASE, SEALS, AND JOINTS REQUIRED LIST (Cont.)

PFOR #	Title	Side	Joint or Location	Final Report Page Number
B-3	Internal Nozzle Joint Condition	Left	Nozzle Joint #5	B-27
B-5	Large Diameter (Joint) O-ring Condition (Detailed)	Left	Nozzle Joint #5	B-28
B-1	Leak Check Plug/SII and Port Condition (At Removal)	Left	Nozzle Joint #5	B-29
B-4	Leak Check Plug/SII Condition (Detailed)	Left	Nozzle Joint #5	B-30
B-6	Small Diameter (Leak Check Plug/SII) O-ring Condition (Detailed)	Left	Nozzle Joint #5	B-31
B-8	Packing With Retainer Condition (Detailed)	Left	Nozzle Fixed Housing	B-32
B-9	Case Factory Joint Condition	Left	Forward Dome	B-33
B-9	Case Factory Joint Condition	Left	Forward	B-34
B-9	Case Factory Joint Condition	Left	Forward Center	B-35
B-9	Case Factory Joint Condition	Left	Aft Center	B-36
B-9	Case Factory Joint Condition	Left	ET Attach/ Stiffener	B-37
B-9	Case Factory Joint Condition	Left	Stiffener/ Stiffener	B-38
B-9	Case Factory Joint Condition	Left	Aft Dome	B-39

(Note: Clarification forms will be inserted after the required PFOR in the Final Report. The clarification form page number will be the same as the required PFOR Final Report page number appended by a sequential alphabetic extension.)

CASE, SEALS, AND JOINTS REQUIRED LIST (Cont.)

PFOR #	Title	Side	Joint or Location	Final Report Page Number
B-2	S&A Device (Barrier-Booster and Environmental Seal Region) Condition	Right	S&A	B-40
B-7	S&A Rotor Shaft O-ring Condition (Detailed)	Right	S&A	B-41
B-1	Leak Check Plug/SII and Port Condition (At Removal)	Right	S&A 126°	B-42
B-4	Leak Check Plug/SII Condition (Detailed)	Right	S&A 126°	B-43
B-6	Small Diameter (Leak Check Plug/SII) O-ring Condition (Detailed)	Right	S&A 126°	B-44
B-1	Leak Check Plug/SII and Port Condition (At Removal)	Right	18° SII	B-45
B-4	Leak Check Plug/SII Condition (Detailed)	Right	18° SII	B-46
B-6	Small Diameter (Leak Check Plug/SII) O-ring Condition (Detailed)	Right	18° SII	B-47
B-1	Leak Check Plug/SII and Port Condition (At Removal)	Right	198° SII	B-48
B-4	Leak Check Plug/SII Condition (Detailed)	Right	198° SII	B-49
B-6	Small Diameter (Leak Check Plug/SII) O-ring Condition (Detailed)	Right	198° SII	B-50

(Note: Clarification forms will be inserted after the required PFOR in the Final Report. The clarification form page number will be the same as the required PFOR Final Report page number appended by a sequential alphabetic extension.)

CASE, SEALS, AND JOINTS REQUIRED LIST (Cont.)

PFOR #	Title	Side	Joint or Location	Final Report Page Number
B-3	Internal Nozzle Joint Condition	Right	Nozzle Joint #2	B-51
B-5	Large Diameter (Joint) O-ring Condition (Detailed)	Right	Nozzle Joint #2	B-52
B-1	Leak Check Plug/SII and Port Condition (At Removal)	Right	Nozzle Joint #2	B-53
B-4	Leak Check Plug/SII Condition (Detailed)	Right	Nozzle Joint #2	B-54
B-6	Small Diameter (Leak Check Plug/SII) O-ring Condition (Detailed)	Right	Nozzle Joint #2	B-55
B-3	Internal Nozzle Joint Condition	Right	Nozzle Joint #3	B-56
B-5	Large Diameter (Joint) O-ring Condition (Detailed)	Right	Nozzle Joint #3	B-57
B-1	Leak Check Plug/SII and Port Condition (At Removal)	Right	Nozzle Joint #3	B-58
B-4	Leak Check Plug/SII Condition (Detailed)	Right	Nozzle Joint #3	B-59
B-6	Small Diameter (Leak Check Plug/SII) O-ring Condition (Detailed)	Right	Nozzle Joint #3	B-60
B-3	Internal Nozzle Joint Condition	Right	Nozzle Joint #4	B-61
B-5	Large Diameter (Joint) O-ring Condition (Detailed)	Right	Nozzle Joint #4	B-62
B-1	Leak Check Plug/SII and Port Condition (At Removal)	Right	Nozzle Joint #4	B-63
B-4	Leak Check Plug/SII Condition (Detailed)	Right	Nozzle Joint #4	B-64
B-6	Small Diameter (Leak Check Plug/SII) O-ring Condition (Detailed)	Right	Nozzle Joint #4	B-65

(Note: Clarification forms will be inserted after the required PFOR in the Final Report. The clarification form page number will be the same as the required PFOR Final Report page number appended by a sequential alphabetic extension.)

CASE, SEALS, AND JOINTS REQUIRED LIST (Cont.)

PFOR #	Title	Side	Joint or Location	Final Report Page Number
B-3	Internal Nozzle Joint Condition	Right	Nozzle Joint #5	B-66
B-5	Large Diameter (Joint) O-ring Condition (Detailed)	Right	Nozzle Joint #5	B-67
B-1	Leak Check Plug/SII and Port Condition (At Removal)	Right	Nozzle Joint #5	B-68
B-4	Leak Check Plug/SII Condition (Detailed)	Right	Nozzle Joint #5	B-69
B-6	Small Diameter (Leak Check Plug/SII) O-ring Condition (Detailed)	Right	Nozzle Joint #5	B-70
B-8	Packing With Retainer Condition (Detailed)	Right	Nozzle Fixed Housing	B-71
B-9	Case Factory Joint Condition	Right	Forward Dome	B-72
B-9	Case Factory Joint Condition	Right	Forward	B-73
B-9	Case Factory Joint Condition	Right	Forward Center	B-74
B-9	Case Factory Joint Condition	Right	Aft Center	B-75
B-9	Case Factory Joint Condition	Right	ET Attach/ Stiffener	B-76
B-9	Case Factory Joint Condition	Right	Stiffener/ Stiffener	B-77
B-9	Case Factory Joint Condition	Right	Aft Dome	B-78

(Note: Clarification forms will be inserted after the required PFOR in the Final Report. The clarification form page number will be the same as the required PFOR Final Report page number appended by a sequential alphabetic extension.)

Thiokol CORPORATION
SPACE OPERATIONS

POSTFLIGHT OBSERVATION RECORD (PFOR) B-2
S&A Device (Barrier-Booster and Environmental Seal Regions) Condition

Motor No.: 360L029	Side: Left (A)	Date: 11/28/93
Assessment Engineer(s)/Inspector(s): Diane Gonnell, Don Bartell, Cal Taylor		

Barrier-Booster Bore and Rotor Observations:	Yes	No	Comment #
A. Heat Affected or Eroded O-ring (In Groove)?		✓	
B. Soot To or Past O-rings?		✓	
C. Heat Affected Metal?		✓	
D. O-ring Damage (In Groove)?		✓	
E. Metal Damage?		✓	
F. Excessive or No Grease?		✓	
G. Corrosion?		✓	
H. Foreign Material?		✓	
I. Teflon Retainer Damage?		✓	
Environmental Seal Region Observations:			
J. Environmental O-ring Assembly Damage (Visible Without Magnification)?		✓	
K. Foreign Material?		✓	

tes / Comments

Preliminary PFAR(s)? ______ Yes __✓__ No   Preliminary PFAR Number(s): ______

Clarification Form(s)? ______ Yes __✓__ No   Clarification Form Page No.(s): ______

POSTFLIGHT OBSERVATION RECORD (PFOR) B-7
S&A Rotor Shaft O-ring Condition (Detailed)

Motor No.: 360L029	Side: Left (A)	Date: 11/29/93
Assessment Engineer(s)/Inspector(s): D. Garrett, D. Burtle II, C. Taylor		
Location: S&A Device Barrier-Booster Rotor Shaft		

	Yes	No	Comment #
Forward Primary O-ring Observations:			
A. Heat Affected or Eroded O-ring?		✓	
B. O-ring Defects/Damage?		✓	
Aft Primary O-ring Observations:			
C. Heat Affected or Eroded O-ring?		✓	
D. O-ring Defects/Damage?		✓	
Forward Secondary O-ring Observations:			
E. Heat Affected or Eroded O-ring?		✓	
F. O-ring Defects/Damage?		✓	
Aft Secondary O-ring Observations:			
G. Heat Affected or Eroded O-ring?		✓	
H. O-ring Defects/Damage?		✓	

Notes / Comments

Preliminary PFAR(s)? _____ Yes ✓ No Preliminary PFAR Number(s): _____

Clarification Form(s)? _____ Yes ✓ No Clarification Form Page No.(s): _____

POSTFLIGHT OBSERVATION RECORD (PFOR) B-1

Leak Check Plug/Sll and Port Condition (At Removal)

Motor No.: 360L029	Side: Left (A)	Date:

Assessment Engineer(s)/Inspector(s):

Location: 126-Degree Barrier-Booster Bore

Leak Check Plug Observations:	Yes	No	Comment #
A. Sooted Metal Surfaces?		✓	
B. Soot To or Past O-ring?		✓	
C. Foreign Material?		✓	
D. O-ring Damage (In Groove)?		✓	
E. Heat Affected or Eroded O-ring (In Groove)?		✓	
F. Excessive or No Grease on O-ring?		✓	
G. Excessive Grease on Plug?		✓	
H. Corrosion?		✓	
I. Thread Damage (Visible at Removal)?		✓	

Leak Check Port Observations:			
J. Sooted Metal Surfaces?		✓	
K. Foreign Material?		✓	
L. Excessive Grease?		✓	
M. Corrosion?		✓	
N. Metal Damage?		✓	
O. Heat Affected Metal?		✓	
P. Obstructed Through Hole?		✓	

Notes / Comments

Preliminary PFAR(s)? _____ Yes ✓ No Preliminary PFAR Number(s): _____

Clarification Form(s)? _____ Yes ✓ No Clarification Form Page No.(s): _____

POSTFLIGHT OBSERVATION RECORD (PFOR) B-4
Leak Check Plug/SII Condition (Detailed)

Motor No.: 360L029	Side: Left (A)	Date: [illegible]
Assessment Engineer(s)/Inspector(s): D. Gravelle, D. Bartell, C. Taylor		
Location: 126-Degree Barrier-Booster Bore		

Leak Check Plug Observations:	Yes	No	Comment #
A. Foreign Material Between the O-ring and Plug?		✓	
B. Heat Affected Metal?		✓	
C. Seal Surface/Thread Damage?	✓		(1)

Notes / Comments

(1) Circumferential lines under plug head lines did not extend into seal surface.

Preliminary PFAR(s)? _____ Yes ___✓___ No Preliminary PFAR Number(s): _____

Clarification Form(s)? _____ Yes ___✓___ No Clarification Form Page No.(s): _____

POSTFLIGHT OBSERVATION RECORD (PFOR) B-6
Small Diameter (Leak Check Plug/SII) O-ring Condition (Detailed)

Motor No.: 360L029	Side: Left (A)	Date: [illegible]
Assessment Engineer(s)/Inspector(s): D. Gaecht, D. Bartell, C. Taller		
Location: 126-Degree Barrier-Booster Bore		

Secondary O-ring Observations:

	Yes	No	Comment #
A. Heat Affected or Eroded O-ring?		✓	
B. O-ring Defects/Damage?		✓	

Notes / Comments

Preliminary PFAR(s)? ______ Yes ✓ No Preliminary PFAR Number(s): ______

Clarification Form(s)? ______ Yes ✓ No Clarification Form Page No.(s): ______

POSTFLIGHT OBSERVATION RECORD (PFOR) B-1
Leak Check Plug/SII and Port Condition (At Removal)

Motor No.: 360L029	Side: Left (A)	Date: 11-23-93

Assessment Engineer(s)/Inspector(s): D Gaeckt, D. Bartelt, C. Taylor

Location: 18-Degree SII

SII Observations:	Yes	No	Comment #
A. Sooted Metal Surfaces?		✓	
B. Soot To or Past O-ring?		✓	
C. Foreign Material?		✓	
D. O-ring Damage (In Groove)?		✓	
E. Heat Affected or Eroded O-ring (In Groove)?		✓	
F. Excessive or No Grease on O-ring?		✓	
G. Excessive Grease on SII?		✓	
H. Corrosion?		✓	
I. Thread Damage (Visible at Removal)?		✓	

SII Port Observations:			
J. Sooted Metal Surfaces?		✓	
K. Foreign Material?		✓	
L. Excessive Grease?		✓	
M. Corrosion?		✓	
N. Metal Damage?		✓	
O. Heat Affected Metal?		✓	
P. Obstructed Leak Check Through Hole?		✓	

Notes / Comments

Preliminary PFAR(s)? ____ Yes ✓ No Preliminary PFAR Number(s): ____

Clarification Form(s)? ____ Yes ✓ No Clarification Form Page No.(s): ____

POSTFLIGHT OBSERVATION RECORD (PFOR) B-4

Leak Check Plug/SII Condition (Detailed)

Motor No.: 360L029	Side: Left (A)	Date: 11-9-93
Assessment Engineer(s)/Inspector(s): D. Gauecht, D. Bartell, C Taylor		
Location: 18-Degree SII		

SII Observations:	Yes	No	Comment #
A. Foreign Material Between the O-ring and SII?		✓	
B. Heat Affected Metal?		✓	
C. Seal Surface/Thread Damage?	✓		1

Notes / Comments

1 Small cluster of surface roughness near seal surface under SII

Preliminary PFAR(s)? ____ Yes ✓ No Preliminary PFAR Number(s): ____

Clarification Form(s)? ____ Yes ✓ No Clarification Form Page No.(s): ____

POSTFLIGHT OBSERVATION RECORD (PFOR) B-6

Small Diameter (Leak Check Plug/SII) O-ring Condition (Detailed)

Motor No.: 360L029	Side: Left (A)	Date: 11-3-92
Assessment Engineer(s)/Inspector(s): D Fawcett, D Bartell, C Taylor		
Location: 18-Degree SII		

	Yes	No	Comment #
Primary O-ring Observations:			
A. Heat Affected or Eroded O-ring?		✓	
B. O-ring Defects/Damage?		✓	
Secondary O-ring Observations:			
C. Heat Affected or Eroded O-ring?		✓	
D. O-ring Defects/Damage?		✓	

Notes / Comments

Preliminary PFAR(s)? ____ Yes ✓ No Preliminary PFAR Number(s): ____

Clarification Form(s)? ____ Yes ✓ No Clarification Form Page No.(s): ____

Thiokol CORPORATION
SPACE OPERATIONS

POSTFLIGHT OBSERVATION RECORD (PFOR) B-1
Leak Check Plug/SII and Port Condition (At Removal)

Motor No.: 360L029	Side: Left (A)	Date: 11-9-93
Assessment Engineer(s)/Inspector(s): D Gaylecht, D Bartell, C. Taylor		
Location: 198-Degree SII		

SII Observations:	Yes	No	Comment #
A. Sooted Metal Surfaces?		✓	
B. Soot To or Past O-ring?		✓	
C. Foreign Material?		✓	
D. O-ring Damage (In Groove)?		✓	
E. Heat Affected or Eroded O-ring (In Groove)?		✓	
F. Excessive or No Grease on O-ring?		✓	
G. Excessive Grease on SII?		✓	
H. Corrosion?		✓	
I. Thread Damage (Visible at Removal)?		✓	
SII Port Observations:			
J. Sooted Metal Surfaces?		✓	
K. Foreign Material?		✓	
L. Excessive Grease?		✓	
M. Corrosion?		✓	
N. Metal Damage?		✓	
O. Heat Affected Metal?		✓	
P. Obstructed Leak Check Through Hole?		✓	

Notes / Comments

Preliminary PFAR(s)? _____ Yes ✓ No Preliminary PFAR Number(s): _____

Clarification Form(s)? _____ Yes ✓ No Clarification Form Page No.(s): _____

POSTFLIGHT OBSERVATION RECORD (PFOR) B-4
Leak Check Plug/SII Condition (Detailed)

Motor No.: 360L029	Side: Left (A)	Date: 11/23/93
Assessment Engineer(s)/Inspector(s): D. Gaeckt, D. Burtelt, C. Taylor		
Location: 198-Degree SII		

SII Observations:	Yes	No	Comment #
A. Foreign Material Between the O-ring and SII?		✓	
B. Heat Affected Metal?		✓	
C. Seal Surface/Thread Damage?		✓	

Notes / Comments

Preliminary PFAR(s)? ____ Yes ✓ No Preliminary PFAR Number(s): ____

Clarification Form(s)? ____ Yes ✓ No Clarification Form Page No.(s): ____

Thiokol CORPORATION
SPACE OPERATIONS

POSTFLIGHT OBSERVATION RECORD (PFOR) B-6

Small Diameter (Leak Check Plug/SII) O-ring Condition (Detailed)

Motor No.: 360L029	Side: Left (A)	Date: 1/30/13
Assessment Engineer(s)/Inspector(s): D Barecht, D Bartelt, C. Taylor		
Location: 198-Degree SII		

	Yes	No	Comment #
Primary O-ring Observations:			
A. Heat Affected or Eroded O-ring?		✓	
B. O-ring Defects/Damage?		✓	
Secondary O-ring Observations:			
C. Heat Affected or Eroded O-ring?		✓	
D. O-ring Defects/Damage?		✓	

Notes / Comments

Preliminary PFAR(s)? _____ Yes ✓ No Preliminary PFAR Number(s): _____

Clarification Form(s)? _____ Yes ✓ No Clarification Form Page No.(s): _____

POSTFLIGHT OBSERVATION RECORD (PFOR) B-3
Internal Nozzle Joint Condition

Motor No.: 360L029	**Side:** Left (A)	**Date:** [illegible]

Assessment Engineer(s)/Inspector(s): [illegible]

Joint: Nose Inlet-to-Flex Bearing-to-Cowl (Joint #2)

Internal Nozzle Joint Observations:	Yes	No	Comment #
A. Soot To or Past O-rings?	✓		[illegible]
B. Heat Affected Metal?		✓	
C. Foreign Material?		✓	
D. RTV in Contact With or Past the Primary O-ring?		✓	
E. O-ring Damage (In Groove)?		✓	
F. Heat Affected or Eroded O-rings (In Groove)?		✓	
G. Excessive or No Grease?		✓	
H. Corrosion?			[illegible]
I. Metal Damage?		✓	

Notes / Comments

[illegible] Typical scalloped sooting between [illegible]
[illegible] to primary [illegible]°-[illegible]°, 90°-[illegible]°, [illegible]-[illegible]
[illegible]-318°

[illegible] aluminum corrosion outboard of
primary full circumference

Preliminary PFAR(s)? ______ Yes ✓ No Preliminary PFAR Number(s): ________

Clarification Form(s)? ______ Yes ✓ No Clarification Form Page No.(s): ________

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POSTFLIGHT OBSERVATION RECORD (PFOR) B-5
Large Diameter (Joint) O-ring Condition (Detailed)

Motor No.: 360L029	Side: Left (A)	Date: 11/5/93

Assessment Engineer(s)/Inspector(s): [illegible]

Joint: Nose Inlet-to-Flex Bearing-to-Cowl (Joint #2)

	Yes	No	Comment #
Primary O-ring Observations:			
A. Heat Affected or Eroded O-ring?	____	✓	____
B. O-ring Damage/Defects?	____	✓	____
Secondary O-ring Observations:			
A. Heat Affected or Eroded O-ring?	____	✓	____
B. O-ring Damage/Defects?	____	✓	____

Notes / Comments

[illegible]liminary PFAR(s)? ____ Yes ✓ No Preliminary PFAR Number(s): ____

Clarification Form(s)? ____ Yes ✓ No Clarification Form Page No.(s): ____

POSTFLIGHT OBSERVATION RECORD (PFOR) B-1
Leak Check Plug/SII and Port Condition (At Removal)

Motor No.: 360L029	Side: Left (A)	Date: [illegible]

Assessment Engineer(s)/Inspector(s): [illegible]

Location: Nose Inlet-to-Flex Bearing-to-Cowl (Joint #2)

Leak Check Plug Observations:	Yes	No	Comment #
A. Sooted Metal Surfaces?			
B. Soot To or Past O-ring?			
C. Foreign Material?			
D. O-ring Damage (In Groove)?			
E. Heat Affected or Eroded O-ring (In Groove)?			
F. Excessive or No Grease on O-ring?			
G. Excessive Grease on Plug?			
H. Corrosion?			
I. Thread Damage (Visible at Removal)?			
Leak Check Port Observations:			
J. Sooted Metal Surfaces?			
K. Foreign Material?			
L. Excessive Grease?			
M. Corrosion?			
N. Metal Damage?			
O. Heat Affected Metal?			
P. Obstructed Through Hole?			

Notes / Comments

[illegible]

Preliminary PFAR(s)? _____ Yes ___/___ No Preliminary PFAR Number(s): _____

Clarification Form(s)? _____ Yes ___/___ No Clarification Form Page No.(s): _____

POSTFLIGHT OBSERVATION RECORD (PFOR) B-4
Leak Check Plug/SII Condition (Detailed)

Motor No.: 360L029	Side: Left (A)	Date: [illegible]
Assessment Engineer(s)/Inspector(s): [illegible]		
Location: Nose Inlet-to-Flex Bearing-to-Cowl (Joint #2)		

Leak Check Plug Observations:	Yes	No	Comment #
A. Foreign Material Between the O-ring and Plug?		V	
B. Heat Affected Metal?		V	
C. Seal Surface/Thread Damage?		V	

Notes / Comments

Preliminary PFAR(s)? _____ Yes ___V___ No Preliminary PFAR Number(s): _____

Clarification Form(s)? _____ Yes ___V___ No Clarification Form Page No.(s): _____

POSTFLIGHT OBSERVATION RECORD (PFOR) B-6

Small Diameter (Leak Check Plug/SII) O-ring Condition (Detailed)

Motor No.: 360L029	Side: Left (A)	Date:

Assessment Engineer(s)/Inspector(s):

Location: Nose Inlet-to-Flex Bearing-to-Cowl (Joint #2)

Secondary O-ring Observations:	Yes	No	Comment #
A. Heat Affected or Eroded O-ring?		✓	
B. O-ring Defects/Damage?		✓	

Notes / Comments

Preliminary PFAR(s)? _____ Yes _____ No Preliminary PFAR Number(s): _____

Clarification Form(s)? _____ Yes ✓ No Clarification Form Page No.(s): _____

POSTFLIGHT OBSERVATION RECORD (PFOR) B-3
Internal Nozzle Joint Condition

Motor No.: 360L029	Side: Left (A)	Date: [illegible]
Assessment Engineer(s)/Inspector(s): D Garrett		
Joint: Nose Inlet-to-Throat (Joint #3)		

Internal Nozzle Joint Observations:	Yes	No	Comment #
A. Soot To or Past O-rings?	~~✓~~	✓	~~DAE~~
B. Heat Affected Metal?		✓	
C. Foreign Material?		✓	
D. RTV in Contact With or Past the Primary O-ring?		✓	
E. O-ring Damage (In Groove)?		✓	
F. Heat Affected or Eroded O-rings (In Groove)?		✓	
G. Excessive or No Grease?		✓	
H. Corrosion?		✓	
I. Metal Damage?		✓	

Notes / Comments

[illegible] DAE 9-17-93

Preliminary PFAR(s)? _____ Yes _____ No Preliminary PFAR Number(s): _____

Clarification Form(s)? _____ Yes _____ No Clarification Form Page No.(s): _____

POSTFLIGHT OBSERVATION RECORD (PFOR) B-5
Large Diameter (Joint) O-ring Condition (Detailed)

Motor No.: 360L029	Side: Left (A)	Date: [illegible]
Assessment Engineer(s)/Inspector(s): [illegible]		
Joint: Nose Inlet-to-Throat (Joint #3)		

	Yes	No	Comment #
Primary O-ring Observations:			
A. Heat Affected or Eroded O-ring?		V	
B. O-ring Damage/Defects?			
Secondary O-ring Observations:			
A. Heat Affected or Eroded O-ring?		V	
B. O-ring Damage/Defects?		V	

Notes / Comments

[illegible]liminary PFAR(s)? _____ Yes _____ No Preliminary PFAR Number(s): _____

[illegible]arification Form(s)? _____ Yes _____ No Clarification Form Page No.(s): _____

POSTFLIGHT OBSERVATION RECORD (PFOR) B-1
Leak Check Plug/SII and Port Condition (At Removal)

Motor No.: 360L029	Side: Left (A)	Date: [illegible]
Assessment Engineer(s)/Inspector(s): [illegible]		
Location: Nose Inlet-to-Throat (Joint #3)		

Leak Check Plug Observations:	Yes	No	Comment #
A. Sooted Metal Surfaces?		/	
B. Soot To or Past O-ring?		/	
C. Foreign Material?		/	
D. O-ring Damage (In Groove)?		/	
E. Heat Affected or Eroded O-ring (In Groove)?		/	
F. Excessive or No Grease on O-ring?		/	
G. Excessive Grease on Plug?		/	
H. Corrosion?		/	
I. Thread Damage (Visible at Removal)?		/	

Leak Check Port Observations:			
J. Sooted Metal Surfaces?		/	
K. Foreign Material?		/	
L. Excessive Grease?		/	
M. Corrosion?		/	
N. Metal Damage?		/	
O. Heat Affected Metal?		/	
P. Obstructed Through Hole?		/	

Notes / Comments

[illegible] 37 m lb
[illegible] 15 lb

Preliminary PFAR(s)? _____ Yes _____ No Preliminary PFAR Number(s): _____

Clarification Form(s)? _____ Yes _____ No Clarification Form Page No.(s): _____

POSTFLIGHT OBSERVATION RECORD (PFOR) B-4
Leak Check Plug/SII Condition (Detailed)

Motor No.: 360L029	Side: Left (A)	Date: 1/28/86
Assessment Engineer(s)/Inspector(s): Dick Blount		
Location: Nose Inlet-to-Throat (Joint #3)		

Leak Check Plug Observations:	Yes	No	Comment #
A. Foreign Material Between the O-ring and Plug?		✓	
B. Heat Affected Metal?		✓	
C. Seal Surface/Thread Damage?		✓	

Notes / Comments

Preliminary PFAR(s)? _____ Yes ___✓___ No Preliminary PFAR Number(s): _____

Clarification Form(s)? _____ Yes ___✓___ No Clarification Form Page No.(s): _____

POSTFLIGHT OBSERVATION RECORD (PFOR) B-6
Small Diameter (Leak Check Plug/SII) O-ring Condition (Detailed)

Motor No.: 360L029	Side: Left (A)	Date:
Assessment Engineer(s)/Inspector(s):		
Location: Nose Inlet-to-Throat (Joint #3)		

Secondary O-ring Observations:	Yes	No	Comment #
A. Heat Affected or Eroded O-ring?		✓	
B. O-ring Defects/Damage?		✓	

Notes / Comments

Preliminary PFAR(s)? _____ Yes ___✓___ No Preliminary PFAR Number(s): _____

Clarification Form(s)? _____ Yes ___✓___ No Clarification Form Page No.(s): _____

POSTFLIGHT OBSERVATION RECORD (PFOR) B-3
Internal Nozzle Joint Condition

Motor No.: 360L029	Side: Left (A)	Date: 26 Jan 93
Assessment Engineer(s)/Inspector(s): Jeff Haberstroh, Bob ~~Cook~~ Quick		
Joint: Throat-to-Forward Exit Cone (Joint #4)		

Internal Nozzle Joint Observations:	Yes	No	Comment #
A. Soot To or Past O-rings?		✓	
B. Heat Affected Metal?		✓	
C. Foreign Material?		✓	
D. RTV in Contact With or Past the Primary O-ring?	✓		2
E. O-ring Damage (In Groove)?		✓	
F. Heat Affected or Eroded O-rings (In Groove)?		✓	
G. Excessive or No Grease?		✓	
H. Corrosion?	✓		1
I. Metal Damage?		✓	

Notes / Comments

~~(1.) Light-to-medium corrosion was observed on the FEC seal region from 95-107 degrees. The corrosion was intermittent in this location.~~

~~Medium-to-heavy corrosion was observed on the forward~~ aft ~~end of the throat between the primary and secondary seal locations from 180° 205° and from 85°-140°~~

~~(2.) See sheet C-34~~

(1.) Light-to-medium corrosion was observed on the FEC seal region, from 200 to 290 degrees.
intermittently

Medium-to heavy corrosion was observed on the aft end of the throat intermittently ~~between~~ full circumference. Corrosion was on aft face near I.D. of part and also between primary and secondary seal locations.

(2.) See sheet C-7

Preliminary PFAR(s)? ✓ Yes ____ No Preliminary PFAR Number(s): 54C-03

Clarification Form(s)? ____ Yes ✓ No Clarification Form Page No.(s): ____

POSTFLIGHT OBSERVATION RECORD (PFOR) B-5
Large Diameter (Joint) O-ring Condition (Detailed)

Motor No.: 360L029	Side: Left (A)	Date: 26 Jan 93
Assessment Engineer(s)/Inspector(s): Dave Bartelt, Jeff Haberstich		
Joint: Throat-to-Forward Exit Cone (Joint #4)		

	Yes	No	Comment #
Primary O-ring Observations:			
A. Heat Affected or Eroded O-ring?		✓	
B. O-ring Damage/Defects?		✓	
Secondary O-ring Observations:			
A. Heat Affected or Eroded O-ring?		✓	
B. O-ring Damage/Defects?		✓	

Notes / Comments

Preliminary PFAR(s)? ____ Yes ✓ No Preliminary PFAR Number(s): ____

Clarification Form(s)? ____ Yes ✓ No Clarification Form Page No.(s): ____

POSTFLIGHT OBSERVATION RECORD (PFOR) B-1

Leak Check Plug/SII and Port Condition (At Removal)

Motor No.: 360L029	Side: Left (A)	Date: 26 January 93

Assessment Engineer(s)/Inspector(s): Jeff Haberstich, Dave Bartelt, Chad Jensen

Location: Throat-to-Forward Exit Cone (Joint #4)

	Yes	No	Comment #
Leak Check Plug Observations:			
A. Sooted Metal Surfaces?		✓	
B. Soot To or Past O-ring?		✓	
C. Foreign Material?		✓	
D. O-ring Damage (In Groove)?		✓	
E. Heat Affected or Eroded O-ring (In Groove)?		✓	
F. Excessive or No Grease on O-ring?		✓	
G. Excessive Grease on Plug?		✓	
H. Corrosion?		✓	
I. Thread Damage (Visible at Removal)?		✓	
Leak Check Port Observations:			
J. Sooted Metal Surfaces?		✓	
K. Foreign Material?		✓	
L. Excessive Grease?		✓	
M. Corrosion?	~~✓~~	✓	~~1~~
N. Metal Damage?		✓	
O. Heat Affected Metal?		✓	
P. Obstructed Through Hole?		✓	

Notes / Comments

Breakaway torque: ~~37 in-lbs~~ 43 in-lbs
Running torque: ~~12 in-lbs~~ 10 in-lbs

~~(1) Light to medium corrosion was observed on port spotface for approximately 0.1" circumference.~~

Preliminary PFAR(s)? ____ Yes ✓ No Preliminary PFAR Number(s): ____

Clarification Form(s)? ____ Yes ✓ No Clarification Form Page No.(s): ____

POSTFLIGHT OBSERVATION RECORD (PFOR) B-4

Leak Check Plug/Sil Condition (Detailed)

Motor No.: 360L029	Side: Left (A)	Date: 26 Jan 93

Assessment Engineer(s)/Inspector(s): Jeff Haberstich

Location: Throat-to-Forward Exit Cone (Joint #4)

Leak Check Plug Observations:	Yes	No	Comment #
A. Foreign Material Between the O-ring and Plug?		✓	
B. Heat Affected Metal?		✓	
C. Seal Surface/Thread Damage?		✓	

Notes / Comments

Preliminary PFAR(s)? ____ Yes ✓ No Preliminary PFAR Number(s): ____

Clarification Form(s)? ____ Yes ✓ No Clarification Form Page No.(s): ____

POSTFLIGHT OBSERVATION RECORD (PFOR) B-6

Small Diameter (Leak Check Plug/SII) O-ring Condition (Detailed)

Motor No.: 360L029	Side: Left (A)	Date: 26 Jan 93

Assessment Engineer(s)/Inspector(s): Jeff Haberstich

Location: Throat-to-Forward Exit Cone (Joint #4)

Secondary O-ring Observations:	Yes	No	Comment #
A. Heat Affected or Eroded O-ring?		✓	
B. O-ring Defects/Damage?		✓	

Notes / Comments

Preliminary PFAR(s)? ____ Yes ✓ No Preliminary PFAR Number(s): ____

Clarification Form(s)? ____ Yes ✓ No Clarification Form Page No.(s): ____

POSTFLIGHT OBSERVATION RECORD (PFOR) B-3

Internal Nozzle Joint Condition

Motor No.: 360L029	Side: Left (A)	Date: 27 Jan 93
Assessment Engineer(s)/Inspector(s): Jeff Haberstich, Jim Passman, Bill Ferguson		
Joint: Aft End Ring-to-Fixed Housing (Joint #5)		

Internal Nozzle Joint Observations:	Yes	No	Comment #
A. Soot To or Past O-rings?		✓	
B. Heat Affected Metal?		✓	
C. Foreign Material?		✓	
D. RTV in Contact With or Past the Primary O-ring?	✓		1
E. O-ring Damage (In Groove)?		✓	
F. Heat Affected or Eroded O-rings (In Groove)?		✓	
G. Excessive or No Grease?		✓	
H. Corrosion?	✓		2
I. Metal Damage?		✓	

Notes / Comments

(1.) RTV was observed in contact with the primary O-ring at the following locations: 50°-107°, 225°-230°, 240°-245°.

(2.) Light to medium corrosion was observed, intermittently on the aft end ring flange ID, full circumference.

Preliminary PFAR(s)? ____ Yes ✓ No Preliminary PFAR Number(s): ____

Clarification Form(s)? ____ Yes ✓ No Clarification Form Page No.(s): ____

POSTFLIGHT OBSERVATION RECORD (PFOR) B-5
Large Diameter (Joint) O-ring Condition (Detailed)

Motor No.: 360L029	Side: Left (A)	Date: 27 Jan 93

Assessment Engineer(s)/Inspector(s): Jeff Haberstock, Bill Ferguson

Joint: Aft End Ring-to-Fixed Housing (Joint #5)

	Yes	No	Comment #
Primary O-ring Observations:			
A. Heat Affected or Eroded O-ring?		✓	
B. O-ring Damage/Defects?		✓	
Secondary O-ring Observations:			
A. Heat Affected or Eroded O-ring?		✓	
B. O-ring Damage/Defects?		✓	

Notes / Comments

Preliminary PFAR(s)? ____ Yes ✓ No Preliminary PFAR Number(s): ____

Clarification Form(s)? ____ Yes ✓ No Clarification Form Page No.(s): ____

POSTFLIGHT OBSERVATION RECORD (PFOR) B-1
Leak Check Plug/SII and Port Condition (At Removal)

Motor No.: 360L029	Side: Left (A)	Date: 27 Jun 93
Assessment Engineer(s)/Inspector(s): Jeff Haberstich, Bill Ferguson		
Location: Aft End Ring-to-Fixed Housing (Joint #5)		

Leak Check Plug Observations:	Yes	No	Comment #
A. Sooted Metal Surfaces?		✓	
B. Soot To or Past O-ring?		✓	
C. Foreign Material?		✓	
D. O-ring Damage (In Groove)?		✓	
E. Heat Affected or Eroded O-ring (In Groove)?		✓	
F. Excessive or No Grease on O-ring?		✓	
G. Excessive Grease on Plug?		✓	
H. Corrosion?		✓	
I. Thread Damage (Visible at Removal)?		✓	
Leak Check Port Observations:			
J. Sooted Metal Surfaces?		✓	
K. Foreign Material?		✓	
L. Excessive Grease?		✓	
M. Corrosion?	✓		1
N. Metal Damage?		✓	
O. Heat Affected Metal?		✓	
P. Obstructed Through Hole?		✓	

Notes / Comments

Breakaway torque: 35 in-lbs
Running torque: 8 in-lbs
(1.) Medium corrosion was observed on port spotface

Preliminary PFAR(s)? ____ Yes ✓ No Preliminary PFAR Number(s): ____

Clarification Form(s)? ____ Yes ✓ No Clarification Form Page No.(s): ____

POSTFLIGHT OBSERVATION RECORD (PFOR) B-4

Leak Check Plug/SII Condition (Detailed)

Motor No.: 360L029	Side: Left (A)	Date: 27 January 1993

Assessment Engineer(s)/Inspector(s): Jeff Haberstich, Bill Ferguson

Location: Aft End Ring-to-Fixed Housing (Joint #5)

Leak Check Plug Observations:	Yes	No	Comment #
A. Foreign Material Between the O-ring and Plug?		✓	
B. Heat Affected Metal?		✓	
C. Seal Surface/Thread Damage?		✓	

Notes / Comments

Preliminary PFAR(s)? ____ Yes ✓ No Preliminary PFAR Number(s): ____

Clarification Form(s)? ____ Yes ✓ No Clarification Form Page No.(s): ____

POSTFLIGHT OBSERVATION RECORD (PFOR) B-6

Small Diameter (Leak Check Plug/Sll) O-ring Condition (Detailed)

Motor No.: 360L029	Side: Left (A)	Date: 27 January 1993

Assessment Engineer(s)/Inspector(s): Jeff Haberstich, Bill Ferguson

Location: Aft End Ring-to-Fixed Housing (Joint #5)

Secondary O-ring Observations:	Yes	No	Comment #
A. Heat Affected or Eroded O-ring?		✓	
B. O-ring Defects/Damage?		✓	

Notes / Comments

Preliminary PFAR(s)? ____ Yes ✓ No Preliminary PFAR Number(s): ____

Clarification Form(s)? ____ Yes ✓ No Clarification Form Page No.(s): ____

POSTFLIGHT OBSERVATION RECORD (PFOR) B-8
Packing With Retainer Condition (Detailed)

Motor No.: 360L029	Side: Left (A)	Date: 27 Jan 93
Assessment Engineer(s)/Inspector(s): Jeff Hukriston, Bill Ferguson		
Joint: Aft End Ring-to-Fixed Housing (Joint #5)		

Packing With Retainer Observations:	Yes	No	Comment #
A. Heat Affected or Eroded Seal or Retainer?		✓	
B. Seal or Retainer Damage/Defects?	✓		1
C. Corrosion?	✓		2

Notes / Comments

~~(1.) 65 of 72 packings with retainers had typical disassy damage to the elastomer~~

~~NOTE: NO METAL DAMAGE WAS OBSERVED~~

~~(2) 1 packing with retainer was observed having a small speck of light corrosion.~~

(1.) ALL 72 packings with retainers had typical disassembly damage to the elastomer.
Note: No metal damage was observed.

(2.) 29 packings with retainers were observed having light-to-medium corrosion on the O.D.

Preliminary PFAR(s)? ____ Yes ✓ No Preliminary PFAR Number(s): ____

Clarification Form(s)? ____ Yes ✓ No Clarification Form Page No.(s): ____

POSTFLIGHT OBSERVATION RECORD (PFOR) B-9
Case Factory Joint Condition

Motor No.: 360L029	Side: Left (A)	Date: 5-17-93
Assessment Engineer(s)/Inspector(s): G. RICH		
Factory Joint: Forward Dome		

Case Factory Joint Observations:

	Yes	No	Comment #
A. Heat Affected or Eroded Joint O-ring?		✓	
B. Heavy Corrosion in Joint?		✓	
C. Heavy Corrosion in Leak Check Port?		✓	

Note: Heavy corrosion is defined as corrosion that causes pitting. It may be necessary to remove corrosion to determine if pitting has occurred; however, care should be taken not to damage the hardware. A cloth dampened with solvent or green Scotch-Brite® pads may be used to remove the corrosion. Corrosion removal is to be done in a circumferential direction only.

Notes / Comments

PRIMARY O RING CUT DURING WATER BLAST.

Preliminary PFAR(s)? _____ Yes ✓ No Preliminary PFAR Number(s): _____

Clarification Form(s)? _____ Yes ✓ No Clarification Form Page No.(s): _____

Thiokol CORPORATION
SPACE OPERATIONS

POSTFLIGHT OBSERVATION RECORD (PFOR) B-9
Case Factory Joint Condition

Motor No.: 360L029	Side: Left (A)	Date: 05-18-93

Assessment Engineer(s)/Inspector(s): Schenck

Factory Joint: Forward

Case Factory Joint Observations:	Yes	No	Comment #
A. Heat Affected or Eroded Joint O-ring?		✓	
B. Heavy Corrosion in Joint?		✓	
C. Heavy Corrosion in Leak Check Port?		✓	

Note: Heavy corrosion is defined as corrosion that causes pitting. It may be necessary to remove corrosion to determine if pitting has occurred; however, care should be taken not to damage the hardware. A cloth dampened with solvent or green Scotch-Brite® pads may be used to remove the corrosion. Corrosion removal is to be done in a circumferential direction only.

Notes / Comments

minary PFAR(s)? ____ Yes ✓ No Preliminary PFAR Number(s): ____

Clarification Form(s)? ____ Yes ✓ No Clarification Form Page No.(s): ____

POSTFLIGHT OBSERVATION RECORD (PFOR) B-9

Case Factory Joint Condition

Motor No.: 360L029	Side: Left (A)	Date: 8-3-93
Assessment Engineer(s)/Inspector(s): G. RICH, ERIC HAY		
Factory Joint: Forward Center		

Case Factory Joint Observations:

	Yes	No	Comment #
A. Heat Affected or Eroded Joint O-ring?		✓	
B. Heavy Corrosion in Joint?		✓	
C. Heavy Corrosion in Leak Check Port?		✓	

Note: Heavy corrosion is defined as corrosion that causes pitting. It may be necessary to remove corrosion to determine if pitting has occurred; however, care should be taken not to damage the hardware. A cloth dampened with solvent or green Scotch-Brite® pads may be used to remove the corrosion. Corrosion removal is to be done in a circumferential direction only.

Notes / Comments

NONE

Preliminary PFAR(s)? ____ Yes ✓ No Preliminary PFAR Number(s): ____

Clarification Form(s)? ____ Yes ✓ No Clarification Form Page No.(s): ____

POSTFLIGHT OBSERVATION RECORD (PFOR) B-9

Case Factory Joint Condition

Motor No.: 360L029	Side: Left (A)	Date: 07.27.93

Assessment Engineer(s)/Inspector(s): Schenck

Factory Joint: Aft Center

Case Factory Joint Observations:	Yes	No	Comment #
A. Heat Affected or Eroded Joint O-ring?		✓	
B. Heavy Corrosion in Joint?		✓	
C. Heavy Corrosion in Leak Check Port?		✓	

Note: Heavy corrosion is defined as corrosion that causes pitting. It may be necessary to remove corrosion to determine if pitting has occurred; however, care should be taken not to damage the hardware. A cloth dampened with solvent or green Scotch-Brite® pads may be used to remove the corrosion. Corrosion removal is to be done in a circumferential direction only.

Notes / Comments

Preliminary PFAR(s)? _____ Yes ✓ No Preliminary PFAR Number(s): _____

Clarification Form(s)? _____ Yes ✓ No Clarification Form Page No.(s): _____

POSTFLIGHT OBSERVATION RECORD (PFOR) B-9

Case Factory Joint Condition

Motor No.: 360L029	Side: Left (A)	Date: 4.27.93
Assessment Engineer(s)/Inspector(s): GARY ASPER		
Factory Joint: ET Attach/Stiffener		

Case Factory Joint Observations:

	Yes	No	Comment #
A. Heat Affected or Eroded Joint O-ring?		✓	N/A
B. Heavy Corrosion in Joint?		✓	
C. Heavy Corrosion in Leak Check Port?		✓	A

Note: Heavy corrosion is defined as corrosion that causes pitting. It may be necessary to remove corrosion to determine if pitting has occurred; however, care should be taken not to damage the hardware. A cloth dampened with solvent or green Scotch-Brite® pads may be used to remove the corrosion. Corrosion removal is to be done in a circumferential direction only.

Notes / Comments

N/A

Preliminary PFAR(s)? ____ Yes ✓ No Preliminary PFAR Number(s): N/A

Clarification Form(s)? ____ Yes ✓ No Clarification Form Page No.(s): N/A

POSTFLIGHT OBSERVATION RECORD (PFOR) B-9

Case Factory Joint Condition

Motor No.: 360L029	Side: Left (A)	Date: 4-27-93
Assessment Engineer(s)/Inspector(s): GARY ASPER		
Factory Joint: Stiffener/Stiffener		

Case Factory Joint Observations:	Yes	No	Comment #
A. Heat Affected or Eroded Joint O-ring?		✓	N/A
B. Heavy Corrosion in Joint?		✓	
C. Heavy Corrosion in Leak Check Port?		✓	A

Note: Heavy corrosion is defined as corrosion that causes pitting. It may be necessary to remove corrosion to determine if pitting has occurred; however, care should be taken not to damage the hardware. A cloth dampened with solvent or green Scotch-Brite® pads may be used to remove the corrosion. Corrosion removal is to be done in a circumferential direction only.

Notes / Comments

N/A

Preliminary PFAR(s)? _____ Yes ___✓___ No Preliminary PFAR Number(s): N/A

Clarification Form(s)? _____ Yes ___✓___ No Clarification Form Page No.(s): N/A

POSTFLIGHT OBSERVATION RECORD (PFOR) B-9

Case Factory Joint Condition

Motor No.: 360L029	Side: Left (A)	Date: 4.27.93

Assessment Engineer(s)/Inspector(s): GARY ASPER

Factory Joint: Aft Dome

Case Factory Joint Observations:	Yes	No	Comment #
A. Heat Affected or Eroded Joint O-ring?		✓	N/A
B. Heavy Corrosion in Joint?		✓	
C. Heavy Corrosion in Leak Check Port?		✓	A

Note: Heavy corrosion is defined as corrosion that causes pitting. It may be necessary to remove corrosion to determine if pitting has occurred; however, care should be taken not to damage the hardware. A cloth dampened with solvent or green Scotch-Brite® pads may be used to remove the corrosion. Corrosion removal is to be done in a circumferential direction only.

Notes / Comments

N/A

Preliminary PFAR(s)? ____ Yes ✓ No Preliminary PFAR Number(s): N/A

Clarification Form(s)? ____ Yes ✓ No Clarification Form Page No.(s): N/A

POSTFLIGHT OBSERVATION RECORD (PFOR) B-2
S&A Device (Barrier-Booster and Environmental Seal Regions) Condition

Motor No.: 360L029	Side: Right (B)	Date: [illegible]
Assessment Engineer(s)/Inspector(s): Gaecht, Bartell, Taylor		

Barrier-Booster Bore and Rotor Observations:	Yes	No	Comment #
A. Heat Affected or Eroded O-ring (In Groove)?		✓	
B. Soot To or Past O-rings?		✓	
C. Heat Affected Metal?		✓	
D. O-ring Damage (In Groove)?		✓	
E. Metal Damage?		✓	
F. Excessive or No Grease?		✓	
G. Corrosion?		✓	
H. Foreign Material?		✓	
I. Teflon Retainer Damage?		✓	
Environmental Seal Region Observations:			
J. Environmental O-ring Assembly Damage (Visible Without Magnification)?		✓	
K. Foreign Material?		✓	

s / Comments

Preliminary PFAR(s)? ______ Yes ✓ No Preliminary PFAR Number(s): ______

..ification Form(s)? ______ Yes ✓ No Clarification Form Page No.(s): ______

POSTFLIGHT OBSERVATION RECORD (PFOR) B-7
S&A Rotor Shaft O-ring Condition (Detailed)

Motor No.: 360L029	Side: Right (B)	Date: [illegible]

Assessment Engineer(s)/Inspector(s): D. Garrett, D. Bartell, C. Taylor

Location: S&A Device Barrier-Booster Rotor Shaft

	Yes	No	Comment #
Forward Primary O-ring Observations:			
A. Heat Affected or Eroded O-ring?		✓	
B. O-ring Defects/Damage?		✓	
Aft Primary O-ring Observations:			
C. Heat Affected or Eroded O-ring?		✓	
D. O-ring Defects/Damage?		✓	
Forward Secondary O-ring Observations:			
E. Heat Affected or Eroded O-ring?		✓	
F. O-ring Defects/Damage?		✓	
Aft Secondary O-ring Observations:			
G. Heat Affected or Eroded O-ring?		✓	
H. O-ring Defects/Damage?		✓	

Notes / Comments

Preliminary PFAR(s)? ____ Yes ✓ No   Preliminary PFAR Number(s): ________

Clarification Form(s)? ____ Yes ✓ No   Clarification Form Page No.(s): ________

POSTFLIGHT OBSERVATION RECORD (PFOR) B-1
Leak Check Plug/SII and Port Condition (At Removal)

Motor No.: 360L029	Side: Right (B)	Date: 4-6-98

Assessment Engineer(s)/Inspector(s): D. Garrett, D. Burtett, C. Taylor

Location: 126-Degree Barrier-Booster Bore

	Yes	No	Comment #
Leak Check Plug Observations:			
A. Sooted Metal Surfaces?		✓	
B. Soot To or Past O-ring?		✓	
C. Foreign Material?		✓	
D. O-ring Damage (In Groove)?		✓	
E. Heat Affected or Eroded O-ring (In Groove)?		✓	
F. Excessive or No Grease on O-ring?		✓	
G. Excessive Grease on Plug?		✓	
H. Corrosion?		✓	
I. Thread Damage (Visible at Removal)?		✓	
Leak Check Port Observations:			
J. Sooted Metal Surfaces?		✓	
K. Foreign Material?		✓	
L. Excessive Grease?		✓	
M. Corrosion?		✓	
N. Metal Damage?		✓	
O. Heat Affected Metal?		✓	
P. Obstructed Through Hole?		✓	

Notes / Comments

Preliminary PFAR(s)? _____ Yes ✓ No Preliminary PFAR Number(s): _____

Clarification Form(s)? _____ Yes ✓ No Clarification Form Page No.(s): _____

POSTFLIGHT OBSERVATION RECORD (PFOR) B-4
Leak Check Plug/SII Condition (Detailed)

Motor No.: 360L029	Side: Right (B)	Date: 11/20/92
Assessment Engineer(s)/Inspector(s): D. Garecht, D. Bartelt, C. Taylor		
Location: 126-Degree Barrier-Booster Bore		

Leak Check Plug Observations:	Yes	No	Comment #
A. Foreign Material Between the O-ring and Plug?		✓	
B. Heat Affected Metal?		✓	
C. Seal Surface/Thread Damage?		✓	

Notes / Comments

Preliminary PFAR(s)? _____ Yes ___✓___ No Preliminary PFAR Number(s): _____

Clarification Form(s)? _____ Yes ___✓___ No Clarification Form Page No.(s): _____

POSTFLIGHT OBSERVATION RECORD (PFOR) B-6

Small Diameter (Leak Check Plug/Sll) O-ring Condition (Detailed)

Motor No.: 360L029	Side: Right (B)	Date: 11/2/92

Assessment Engineer(s)/Inspector(s): D. Gorcht, D. Bartelt, C. Taylor

Location: 126-Degree Barrier-Booster Bore

Secondary O-ring Observations:	Yes	No	Comment #
A. Heat Affected or Eroded O-ring?		✓	
B. O-ring Defects/Damage?		✓	

Notes / Comments

Preliminary PFAR(s)? _____ Yes ✓ No Preliminary PFAR Number(s): _____

Clarification Form(s)? _____ Yes ✓ No Clarification Form Page No.(s): _____

POSTFLIGHT OBSERVATION RECORD (PFOR) B-1

Leak Check Plug/SII and Port Condition (At Removal)

Motor No.: 360L029	Side: Right (B)	Date: 11-23-93

Assessment Engineer(s)/Inspector(s): D. Grant, D. Barton, C. Taylor

Location: 18-Degree SII

SII Observations:	Yes	No	Comment #
A. Sooted Metal Surfaces?		✓	
B. Soot To or Past O-ring?		✓	
C. Foreign Material?		✓	
D. O-ring Damage (In Groove)?		✓	
E. Heat Affected or Eroded O-ring (In Groove)?		✓	
F. Excessive or No Grease on O-ring?		✓	
G. Excessive Grease on SII?		✓	
H. Corrosion?		✓	
I. Thread Damage (Visible at Removal)?		✓	

SII Port Observations:			
J. Sooted Metal Surfaces?		✓	
K. Foreign Material?		✓	
L. Excessive Grease?		✓	
M. Corrosion?		✓	
N. Metal Damage?		✓	
O. Heat Affected Metal?		✓	
P. Obstructed Leak Check Through Hole?		✓	

Notes / Comments

Preliminary PFAR(s)? ____ Yes ✓ No Preliminary PFAR Number(s): ____

Clarification Form(s)? ____ Yes ✓ No Clarification Form Page No.(s): ____

POSTFLIGHT OBSERVATION RECORD (PFOR) B-4

Leak Check Plug/SII Condition (Detailed)

Motor No.: 360L029	Side: Right (B)	Date: 11/29/93
Assessment Engineer(s)/Inspector(s): D Garrett, D Bartelt, C. Taylor		
Location: 18-Degree SII		

SII Observations:	Yes	No	Comment #
A. Foreign Material Between the O-ring and SII?		✓	
B. Heat Affected Metal?		✓	
C. Seal Surface/Thread Damage?		✓	

Notes / Comments

Preliminary PFAR(s)? ____ Yes ✓ No Preliminary PFAR Number(s): ____

Clarification Form(s)? ____ Yes ✓ No Clarification Form Page No.(s): ____

POSTFLIGHT OBSERVATION RECORD (PFOR) B-6

Small Diameter (Leak Check Plug/SII) O-ring Condition (Detailed)

Motor No.: 360L029	Side: Right (B)	Date: 11/25/93
Assessment Engineer(s)/Inspector(s): Earecht, Bartie/H, Taylor		
Location: 18-Degree SII		

Primary O-ring Observations:	Yes	No	Comment #
A. Heat Affected or Eroded O-ring?		✓	
B. O-ring Defects/Damage?		✓	
Secondary O-ring Observations:			
C. Heat Affected or Eroded O-ring?		✓	
D. O-ring Defects/Damage?		✓	

Notes / Comments

Preliminary PFAR(s)? _____ Yes ✓ No Preliminary PFAR Number(s): _____

Clarification Form(s)? _____ Yes ✓ No Clarification Form Page No.(s): _____

POSTFLIGHT OBSERVATION RECORD (PFOR) B-1

Leak Check Plug/SII and Port Condition (At Removal)

Motor No.: 360L029	Side: Right (B)	Date: 4-22-93
Assessment Engineer(s)/Inspector(s): D Garecht, D. Bartz, H. L. Taylor		
Location: 198-Degree SII		

SII Observations:	Yes	No	Comment #
A. Sooted Metal Surfaces?		✓	
B. Soot To or Past O-ring?		✓	
C. Foreign Material?		✓	
D. O-ring Damage (In Groove)?		✓	
E. Heat Affected or Eroded O-ring (In Groove)?		✓	
F. Excessive or No Grease on O-ring?		✓	
G. Excessive Grease on SII?		✓	
H. Corrosion?		✓	
I. Thread Damage (Visible at Removal)?		✓	
SII Port Observations:			
J. Sooted Metal Surfaces?		✓	
K. Foreign Material?		✓	
L. Excessive Grease?		✓	
M. Corrosion?		✓	
N. Metal Damage?		✓	
O. Heat Affected Metal?		✓	
P. Obstructed Leak Check Through Hole?		✓	

Notes / Comments

Preliminary PFAR(s)? _____ Yes ✓ No Preliminary PFAR Number(s): _____

Clarification Form(s)? _____ Yes ✓ No Clarification Form Page No.(s): _____

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SPACE OPERATIONS

POSTFLIGHT OBSERVATION RECORD (PFOR) B-4
Leak Check Plug/SII Condition (Detailed)

Motor No.: 360L029	Side: Right (B)	Date: 1/2?/93
Assessment Engineer(s)/Inspector(s): [illegible]		
Location: 198-Degree SII		

SII Observations:

	Yes	No	Comment #
A. Foreign Material Between the O-ring and SII?		✓	
B. Heat Affected Metal?		✓	
C. Seal Surface/Thread Damage?		✓	

Notes / Comments

Preliminary PFAR(s)? ____ Yes ✓ No Preliminary PFAR Number(s): ____

Clarification Form(s)? ____ Yes ✓ No Clarification Form Page No.(s): ____

POSTFLIGHT OBSERVATION RECORD (PFOR) B-6

Small Diameter (Leak Check Plug/SII) O-ring Condition (Detailed)

Motor No.: 360L029	Side: Right (B)	Date: 1/31/97
Assessment Engineer(s)/Inspector(s): D Goodrich, D Bartell, C Taylor		
Location: 198-Degree SII		

	Yes	No	Comment #
Primary O-ring Observations:			
A. Heat Affected or Eroded O-ring?		✓	
B. O-ring Defects/Damage?		✓	
Secondary O-ring Observations:			
C. Heat Affected or Eroded O-ring?		✓	
D. O-ring Defects/Damage?		✓	

Notes / Comments

Preliminary PFAR(s)? _____ Yes ✓ No Preliminary PFAR Number(s): _____

Clarification Form(s)? _____ Yes ✓ No Clarification Form Page No.(s): _____

POSTFLIGHT OBSERVATION RECORD (PFOR) B-3

Internal Nozzle Joint Condition

Motor No.: 360L029	Side: Right (B)	Date: 28 January 1993
Assessment Engineer(s)/Inspector(s): Jeff Haberstich, Dave Bartelt, Bob Quick		
Joint: Nose Inlet-to-Flex Bearing-to-Cowl (Joint #2)		

Internal Nozzle Joint Observations:	Yes	No	Comment #
A. Soot To or Past O-rings?	✓		1
B. Heat Affected Metal?		✓	
C. Foreign Material?		✓	
D. RTV in Contact With or Past the Primary O-ring?		✓	
E. O-ring Damage (In Groove)?		✓	
F. Heat Affected or Eroded O-rings (In Groove)?		✓	
G. Excessive or No Grease?		✓	
H. Corrosion?	✓		2
I. Metal Damage?		✓	3

Notes / Comments

(1.) Typical scalloped shaped sooting was observed between the bolt holes full circumference with soot reaching the primary O-ring from 156° to 174° and from 204° to 0° to 24°.

(2.) Light-to-medium corrosion/oxidation was observed outboard of the primary O-ring location full circumference on both the nose and forward end ring.

(3.) Typical burnish marks due to disassembly were observed intermittently on the nose inlet housing secondary O-ring sealing surface.

Preliminary PFAR(s)? ____ Yes ✓ No Preliminary PFAR Number(s): ____

Clarification Form(s)? ____ Yes ✓ No Clarification Form Page No.(s): ____

POSTFLIGHT OBSERVATION RECORD (PFOR) B-5
Large Diameter (Joint) O-ring Condition (Detailed)

Motor No.: 360L029	Side: Right (B)	Date: [illegible]
Assessment Engineer(s)/Inspector(s): [illegible]		
Joint: Nose Inlet-to-Flex Bearing-to-Cowl (Joint #2)		

	Yes	No	Comment #
Primary O-ring Observations:			
A. Heat Affected or Eroded O-ring?		✓	
B. O-ring Damage/Defects?		✓	
Secondary O-ring Observations:			
A. Heat Affected or Eroded O-ring?		✓	
B. O-ring Damage/Defects?		✓	

Notes / Comments

Preliminary PFAR(s)? ____ Yes ✓ No Preliminary PFAR Number(s): ____

Clarification Form(s)? ____ Yes ✓ No Clarification Form Page No.(s): ____

POSTFLIGHT OBSERVATION RECORD (PFOR) B-1
Leak Check Plug/SII and Port Condition (At Removal)

Motor No.: 360L029	Side: Right (B)	Date: 28 January 1993
Assessment Engineer(s)/Inspector(s): Jeff Haberstich		
Location: Nose Inlet-to-Flex Bearing-to-Cowl (Joint #2)		

Leak Check Plug Observations:	Yes	No	Comment #
A. Sooted Metal Surfaces?		✓	
B. Soot To or Past O-ring?		✓	
C. Foreign Material?		✓	
D. O-ring Damage (In Groove)?		✓	
E. Heat Affected or Eroded O-ring (In Groove)?		✓	
F. Excessive or No Grease on O-ring?		✓	
G. Excessive Grease on Plug?		✓	
H. Corrosion?		✓	
I. Thread Damage (Visible at Removal)?		✓	
Leak Check Port Observations:			
J. Sooted Metal Surfaces?		✓	
K. Foreign Material?		✓	
L. Excessive Grease?		✓	
M. Corrosion?		✓	
N. Metal Damage?		✓	
O. Heat Affected Metal?		✓	
P. Obstructed Through Hole?		✓	

Notes / Comments

Breakaway torque: 50 in-lbs
Running torque: 25 in-lbs

Preliminary PFAR(s)? _____ Yes ✓ No Preliminary PFAR Number(s): _____

Clarification Form(s)? _____ Yes ✓ No Clarification Form Page No.(s): _____

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POSTFLIGHT OBSERVATION RECORD (PFOR) B-4
Leak Check Plug/SII Condition (Detailed)

Motor No.: 360L029	Side: Right (B)	Date: [illegible]
Assessment Engineer(s)/Inspector(s): [illegible]		
Location: Nose Inlet-to-Flex Bearing-to-Cowl (Joint #2)		

Leak Check Plug Observations:	Yes	No	Comment #
A. Foreign Material Between the O-ring and Plug?		✓	
B. Heat Affected Metal?		✓	
C. Seal Surface/Thread Damage?		✓	

Notes / Comments

Preliminary PFAR(s)? ______ Yes ✓ No   Preliminary PFAR Number(s): ______

Clarification Form(s)? ______ Yes ✓ No   Clarification Form Page No.(s): ______

POSTFLIGHT OBSERVATION RECORD (PFOR) B-6
Small Diameter (Leak Check Plug/SII) O-ring Condition (Detailed)

Motor No.: 360L029	Side: Right (B)	Date: 1/28/86
Assessment Engineer(s)/Inspector(s): D. Garrett, Dale Barker		
Location: Nose Inlet-to-Flex Bearing-to-Cowl (Joint #2)		

Secondary O-ring Observations:	Yes	No	Comment #
A. Heat Affected or Eroded O-ring?		✓	
B. O-ring Defects/Damage?		✓	

Notes / Comments

Preliminary PFAR(s)? _____ Yes ✓ No Preliminary PFAR Number(s): _____

Clarification Form(s)? _____ Yes ✓ No Clarification Form Page No.(s): _____

POSTFLIGHT OBSERVATION RECORD (PFOR) B-3
Internal Nozzle Joint Condition

Motor No.: 360L029	Side: Right (B)	Date: 11/2/93
Assessment Engineer(s)/Inspector(s): D. Garecht, R. Ferguson		
Joint: Nose Inlet-to-Throat (Joint #3)		

Internal Nozzle Joint Observations:	Yes	No	Comment #
A. Soot To or Past O-rings?	—	✓	— GAE
B. Heat Affected Metal?		✓	
C. Foreign Material?		✓	
D. RTV in Contact With or Past the Primary O-ring?		✓	
E. O-ring Damage (In Groove)?		✓	
F. Heat Affected or Eroded O-rings (In Groove)?		✓	
G. Excessive or No Grease?		✓	
H. Corrosion?		✓	
I. Metal Damage?		✓	

Notes / Comments

~~[illegible]~~
~~[illegible] 316° - 353°~~ GAE 9-17-93

Preliminary PFAR(s)? ______ Yes ✓ No   Preliminary PFAR Number(s): ______

Clarification Form(s)? ______ Yes ✓ No   Clarification Form Page No.(s): ______

POSTFLIGHT OBSERVATION RECORD (PFOR) B-5
Large Diameter (Joint) O-ring Condition (Detailed)

Motor No.: 360L029	Side: Right (B)	Date:
Assessment Engineer(s)/Inspector(s):		
Joint: Nose Inlet-to-Throat (Joint #3)		

	Yes	No	Comment #
Primary O-ring Observations:			
A. Heat Affected or Eroded O-ring?		✓	
B. O-ring Damage/Defects?		✓	
Secondary O-ring Observations:			
A. Heat Affected or Eroded O-ring?		✓	
B. O-ring Damage/Defects?		✓	

Notes / Comments

Preliminary PFAR(s)? _____ Yes ✓ No Preliminary PFAR Number(s): _____

Clarification Form(s)? _____ Yes ✓ No Clarification Form Page No.(s): _____

POSTFLIGHT OBSERVATION RECORD (PFOR) B-1
Leak Check Plug/SII and Port Condition (At Removal)

Motor No.: 360L029	Side: Right (B)	Date: [illegible]
Assessment Engineer(s)/Inspector(s): [illegible]		
Location: Nose Inlet-to-Throat (Joint #3)		

Leak Check Plug Observations:	Yes	No	Comment #
A. Sooted Metal Surfaces?		✓	
B. Soot To or Past O-ring?		✓	
C. Foreign Material?		✓	
D. O-ring Damage (In Groove)?		✓	
E. Heat Affected or Eroded O-ring (In Groove)?		✓	
F. Excessive or No Grease on O-ring?		✓	
G. Excessive Grease on Plug?		✓	
H. Corrosion?		✓	
I. Thread Damage (Visible at Removal)?		✓	
Leak Check Port Observations:			
J. Sooted Metal Surfaces?			
K. Foreign Material?			
L. Excessive Grease?		✓	
M. Corrosion?		✓	
N. Metal Damage?		✓	
O. Heat Affected Metal?		✓	
P. Obstructed Through Hole?		✓	

Notes / Comments

[illegible]

Preliminary PFAR(s)? _____ Yes ✓ No Preliminary PFAR Number(s): _____

Clarification Form(s)? _____ Yes ✓ No Clarification Form Page No.(s): _____

POSTFLIGHT OBSERVATION RECORD (PFOR) B-4
Leak Check Plug/SII Condition (Detailed)

Motor No.: 360L029	Side: Right (B)	Date: [illegible]

Assessment Engineer(s)/Inspector(s): [illegible]

Location: Nose Inlet-to-Throat (Joint #3)

Leak Check Plug Observations:	Yes	No	Comment #
A. Foreign Material Between the O-ring and Plug?		√	
B. Heat Affected Metal?		√	
C. Seal Surface/Thread Damage?		√	

Notes / Comments

[illegible]liminary PFAR(s)? _____ Yes ___√___ No Preliminary PFAR Number(s): _____

[illegible]arification Form(s)? _____ Yes ___√___ No Clarification Form Page No.(s): _____

POSTFLIGHT OBSERVATION RECORD (PFOR) B-6

Small Diameter (Leak Check Plug/SII) O-ring Condition (Detailed)

Motor No.: 360L029	Side: Right (B)	Date: 11/8/95

Assessment Engineer(s)/Inspector(s): D. Smith

Location: Nose Inlet-to-Throat (Joint #3)

Secondary O-ring Observations:	Yes	No	Comment #
A. Heat Affected or Eroded O-ring?		V	
B. O-ring Defects/Damage?		✓	

Notes / Comments

Preliminary PFAR(s)? _____ Yes ___V___ No Preliminary PFAR Number(s): _____

Clarification Form(s)? _____ Yes ___V___ No Clarification Form Page No.(s): _____

POSTFLIGHT OBSERVATION RECORD (PFOR) B-3

Internal Nozzle Joint Condition

Motor No.: 360L029	Side: Right (B)	Date: 26 Jan 93
Assessment Engineer(s)/Inspector(s): Jeff Haberstoh, Dave Burtelt, Bob ~~Cook~~ Quirk		
Joint: Throat-to-Forward Exit Cone (Joint #4)		

Internal Nozzle Joint Observations:	Yes	No	Comment #
A. Soot To or Past O-rings?		✓	
B. Heat Affected Metal?		✓	
C. Foreign Material?		✓	
D. RTV in Contact With or Past the Primary O-ring?	✓		2
E. O-ring Damage (In Groove)?		✓	
F. Heat Affected or Eroded O-rings (In Groove)?		✓	
G. Excessive or No Grease?		✓	
H. Corrosion?	✓		1
I. Metal Damage?		✓	

Notes / Comments

(1.) Light-to-medium corrosion was observed on the FEC seal region from 95-107 degrees. The corrosion was intermittent in this location.

Medium-to-heavy corrosion was observed on the aft end of the throat between the primary and secondary seal locations from 180°-205° and from 95°-140° Intermittently

(2.) See sheet C-34

Preliminary PFAR(s)? ____ Yes ✓ No Preliminary PFAR Number(s): 54C-04

Clarification Form(s)? ____ Yes ✓ No Clarification Form Page No.(s): ____

POSTFLIGHT OBSERVATION RECORD (PFOR) B-5

Large Diameter (Joint) O-ring Condition (Detailed)

Motor No.: 360L029	Side: Right (B)	Date: 26 Jan 93

Assessment Engineer(s)/Inspector(s): Dave Bartelt, Jeff Haberstich

Joint: Throat-to-Forward Exit Cone (Joint #4)

	Yes	No	Comment #
Primary O-ring Observations:			
A. Heat Affected or Eroded O-ring?		✓	
B. O-ring Damage/Defects?		✓	
Secondary O-ring Observations:			
A. Heat Affected or Eroded O-ring?		✓	
B. O-ring Damage/Defects?		✓	

Notes / Comments .

Preliminary PFAR(s)? _____ Yes ✓ No Preliminary PFAR Number(s): _____

Clarification Form(s)? _____ Yes ✓ No Clarification Form Page No.(s): _____

POSTFLIGHT OBSERVATION RECORD (PFOR) B-1
Leak Check Plug/Sil and Port Condition (At Removal)

Motor No.: 360L029	Side: Right (B)	Date: 26 Jan 93
Assessment Engineer(s)/Inspector(s): Jeff Haberstroh		
Location: Throat-to-Forward Exit Cone (Joint #4)		

Leak Check Plug Observations:	Yes	No	Comment #
A. Sooted Metal Surfaces?		✓	
B. Soot To or Past O-ring?		✓	
C. Foreign Material?		✓	
D. O-ring Damage (In Groove)?		✓	
E. Heat Affected or Eroded O-ring (In Groove)?		✓	
F. Excessive or No Grease on O-ring?		✓	
G. Excessive Grease on Plug?		✓	
H. Corrosion?		✓	
I. Thread Damage (Visible at Removal)?		✓	
Leak Check Port Observations:			
J. Sooted Metal Surfaces?		✓	
K. Foreign Material?		✓	
L. Excessive Grease?		✓	
M. Corrosion?	✓		1
N. Metal Damage?		✓	
O. Heat Affected Metal?		✓	
P. Obstructed Through Hole?		✓	

Notes / Comments

Breakaway torque: 37 in-lbs

Running torque: 12 in-lbs

① Light-to-medium corrosion was observed on port spotface for approximately 0.1" circumference

Preliminary PFAR(s)? ____ Yes ✓ No Preliminary PFAR Number(s): ____

Clarification Form(s)? ____ Yes ✓ No Clarification Form Page No.(s): ____

POSTFLIGHT OBSERVATION RECORD (PFOR) B-4

Leak Check Plug/SII Condition (Detailed)

Motor No.: 360L029	Side: Right (B)	Date: 26 Jan 93

Assessment Engineer(s)/Inspector(s): Jeff Haberstich

Location: Throat-to-Forward Exit Cone (Joint #4)

Leak Check Plug Observations:	Yes	No	Comment #
A. Foreign Material Between the O-ring and Plug?		✓	
B. Heat Affected Metal?		✓	
C. Seal Surface/Thread Damage?		✓	

Notes / Comments

Preliminary PFAR(s)? _____ Yes ✓ No Preliminary PFAR Number(s): _____

Clarification Form(s)? _____ Yes ✓ No Clarification Form Page No.(s): _____

POSTFLIGHT OBSERVATION RECORD (PFOR) B-6

Small Diameter (Leak Check Plug/SII) O-ring Condition (Detailed)

Motor No.: 360L029	Side: Right (B)	Date: 26 Jan 93

Assessment Engineer(s)/Inspector(s): Jeff Haberstich

Location: Throat-to-Forward Exit Cone (Joint #4)

Secondary O-ring Observations:	Yes	No	Comment #
A. Heat Affected or Eroded O-ring?		✓	
B. O-ring Defects/Damage?		✓	

Notes / Comments

Preliminary PFAR(s)? ____ Yes ✓ No Preliminary PFAR Number(s): ____

Clarification Form(s)? ____ Yes ✓ No Clarification Form Page No.(s): ____

POSTFLIGHT OBSERVATION RECORD (PFOR) B-3

Internal Nozzle Joint Condition

Motor No.: 360L029	Side: Right (B)	Date: 27 ~~26~~ January 93

Assessment Engineer(s)/Inspector(s): Jeff Haberstich

Joint: Aft End Ring-to-Fixed Housing (Joint #5)

Internal Nozzle Joint Observations:	Yes	No	Comment #
A. Soot To or Past O-rings?		✓	
B. Heat Affected Metal?		✓	
C. Foreign Material?		✓	
D. RTV in Contact With or Past the Primary O-ring?	✓		1
E. O-ring Damage (In Groove)?		✓	
F. Heat Affected or Eroded O-rings (In Groove)?		✓	
G. Excessive or No Grease?		✓	
H. Corrosion?	✓		2
I. Metal Damage?		✓	

Notes / Comments

(1.) RTV was ~~observed~~ in contact with the primary O-ring from ~~220° to 330° and from 245° to 257°~~ ~~245° to 355°~~ ~~40° to 70°, 130°~~ 40°–70°, 130°, and 220°–250°.

(2.) Light corrosion was observed on the aft end ring and ~~flex to~~ fixed housing between the O-ring grooves intermittently, full circumference.

Light corrosion was observed on the following stat-o-seal spotfaces 130°, 155°, 160°, 165°, 170°, 215°, 245°.

Medium ~~to heavy~~ corrosion was observed on the aft end ring flange ID ~~Fr~~ intermittently from 150°–0°–80°.

Preliminary PFAR(s)? _____ Yes ✓ No Preliminary PFAR Number(s): _____

Clarification Form(s)? _____ Yes ✓ No Clarification Form Page No.(s): _____

POSTFLIGHT OBSERVATION RECORD (PFOR) B-5

Large Diameter (Joint) O-ring Condition (Detailed)

Motor No.: 360L029	Side: Right (B)	Date: 27 Jan 93
Assessment Engineer(s)/Inspector(s): Jeff Haberstich, Bill Ferguson		
Joint: Aft End Ring-to-Fixed Housing (Joint #5)		

	Yes	No	Comment #
Primary O-ring Observations:			
A. Heat Affected or Eroded O-ring?		✓	
B. O-ring Damage/Defects?		✓	
Secondary O-ring Observations:			
A. Heat Affected or Eroded O-ring?		✓	
B. O-ring Damage/Defects?		✓	

Notes / Comments

Preliminary PFAR(s)? ____ Yes ✓ No Preliminary PFAR Number(s): ____

Clarification Form(s)? ____ Yes ✓ No Clarification Form Page No.(s): ____

POSTFLIGHT OBSERVATION RECORD (PFOR) B-1

Leak Check Plug/SII and Port Condition (At Removal)

Motor No.: 360L029	Side: Right (B)	Date: 27 Jan 93

Assessment Engineer(s)/Inspector(s): Jeff Haberstich

Location: Aft End Ring-to-Fixed Housing (Joint #5)

Leak Check Plug Observations:	Yes	No	Comment #
A. Sooted Metal Surfaces?		✓	
B. Soot To or Past O-ring?		✓	
C. Foreign Material?		✓	
D. O-ring Damage (In Groove)?		✓	
E. Heat Affected or Eroded O-ring (In Groove)?		✓	
F. Excessive or No Grease on O-ring?		✓	
G. Excessive Grease on Plug?		✓	
H. Corrosion?		✓	
I. Thread Damage (Visible at Removal)?		✓	
Leak Check Port Observations:			
J. Sooted Metal Surfaces?		✓	
K. Foreign Material?		✓	
L. Excessive Grease?		✓	
M. Corrosion?		✓	
N. Metal Damage?		✓	
O. Heat Affected Metal?		✓	
P. Obstructed Through Hole?		✓	

Notes / Comments

Breakaway torque 44 in-lbs
Running torque 23 in-lbs

Preliminary PFAR(s)? ____ Yes ✓ No Preliminary PFAR Number(s): ____

Clarification Form(s)? ____ Yes ✓ No Clarification Form Page No.(s): ____

POSTFLIGHT OBSERVATION RECORD (PFOR) B-4

Leak Check Plug/SII Condition (Detailed)

Motor No.: 360L029	Side: Right (B)	Date: 27 January 93

Assessment Engineer(s)/Inspector(s): Jeff Haberstroh, Bill Ferguson

Location: Aft End Ring-to-Fixed Housing (Joint #5)

Leak Check Plug Observations:	Yes	No	Comment #
A. Foreign Material Between the O-ring and Plug?		✓	
B. Heat Affected Metal?		✓	
C. Seal Surface/Thread Damage?		✓	

Notes / Comments

Preliminary PFAR(s)? _____ Yes ✓ No Preliminary PFAR Number(s): _____

Clarification Form(s)? _____ Yes ✓ No Clarification Form Page No.(s): _____

POSTFLIGHT OBSERVATION RECORD (PFOR) B-6

Small Diameter (Leak Check Plug/SII) O-ring Condition (Detailed)

Motor No.: 360L029	Side: Right (B)	Date: 27 January 1993

Assessment Engineer(s)/Inspector(s): Jeff Haberstich, Bill Ferguson

Location: Aft End Ring-to-Fixed Housing (Joint #5)

Secondary O-ring Observations:	Yes	No	Comment #
A. Heat Affected or Eroded O-ring?		✓	
B. O-ring Defects/Damage?		✓	

Notes / Comments

(1) ~~65 of 72 packings with retainers had typical disassembly damage to the elastomer.~~

~~NOTE: No metal damage was observed.~~

(2)

Preliminary PFAR(s)? ____ Yes ✓ No Preliminary PFAR Number(s): ____

Clarification Form(s)? ____ Yes ✓ No Clarification Form Page No.(s): ____

POSTFLIGHT OBSERVATION RECORD (PFOR) B-8
Packing With Retainer Condition (Detailed)

Motor No.: 360L029	Side: Right (B)	Date: 27 January 1993
Assessment Engineer(s)/Inspector(s): Jeff Haberstich, Bill Ferguson		
Joint: Aft End Ring-to-Fixed Housing (Joint #5)		

Packing With Retainer Observations:	Yes	No	Comment #
A. Heat Affected or Eroded Seal or Retainer?		✓	
B. Seal or Retainer Damage/Defects?	✓		1
C. Corrosion?	✓		2

Notes / Comments

(1.) 65 of 72 packings with retainers had typical disassembly damage to the elastomer.

Note: No metal damage was observed.

(2.) 1 packing with retainer was observed having a small speck of light corrosion on its face.

Preliminary PFAR(s)? ____ Yes ✓ No Preliminary PFAR Number(s): ____

Clarification Form(s)? ____ Yes ✓ No Clarification Form Page No.(s): ____

Thiokol CORPORATION
SPACE OPERATIONS

POSTFLIGHT OBSERVATION RECORD (PFOR) B-9
Case Factory Joint Condition

Motor No.: 360L029	Side: Right (B)	Date: 5-28-93
Assessment Engineer(s)/Inspector(s): G. Rich		
Factory Joint: Forward Dome		

Case Factory Joint Observations:	Yes	No	Comment #
A. Heat Affected or Eroded Joint O-ring?		✓	
B. Heavy Corrosion in Joint?		✓	
C. Heavy Corrosion in Leak Check Port?		✓	

Note: Heavy corrosion is defined as corrosion that causes pitting. It may be necessary to remove corrosion to determine if pitting has occurred; however, care should be taken not to damage the hardware. A cloth dampened with solvent or green Scotch-Brite® pads may be used to remove the corrosion. Corrosion removal is to be done in a circumferential direction only.

Notes / Comments: NONE

Special Issue 3.2.3.1

Preliminary PFAR(s)? ____ Yes ✓ No Preliminary PFAR Number(s): NONE

Clarification Form(s)? ____ Yes ✓ No Clarification Form Page No.(s): NONE

Thiokol CORPORATION
SPACE OPERATIONS

POSTFLIGHT OBSERVATION RECORD (PFOR) B-9
Case Factory Joint Condition

Motor No.: 360L029	Side: Right (B)	Date: 5-28-93
Assessment Engineer(s)/Inspector(s): G. RICH		
Factory Joint: Forward		

Case Factory Joint Observations:

	Yes	No	Comment #
A. Heat Affected or Eroded Joint O-ring?		✓	
B. Heavy Corrosion in Joint?		✓	
C. Heavy Corrosion in Leak Check Port?		✓ 1	

Note: Heavy corrosion is defined as corrosion that causes pitting. It may be necessary to remove corrosion to determine if pitting has occurred; however, care should be taken not to damage the hardware. A cloth dampened with solvent or green Scotch-Brite® pads may be used to remove the corrosion. Corrosion removal is to be done in a circumferential direction only.

Notes / Comments

NONE

P ıary PFAR(s)? ____ Yes ✓ No Preliminary PFAR Number(s): NONE

ɔlarification Form(s)? ____ Yes ✓ No Clarification Form Page No.(s): NONE

POSTFLIGHT OBSERVATION RECORD (PFOR) B-9

Case Factory Joint Condition

Motor No.: 360L029	Side: Right (B)	Date: 09-15-93
Assessment Engineer(s)/Inspector(s): WADE CARDIN		
Factory Joint: Forward Center		

Case Factory Joint Observations:	Yes	No	Comment #
A. Heat Affected or Eroded Joint O-ring?		✓	
B. Heavy Corrosion in Joint?		✓	
C. Heavy Corrosion in Leak Check Port?		✓	

Note: Heavy corrosion is defined as corrosion that causes pitting. It may be necessary to remove corrosion to determine if pitting has occurred; however, care should be taken not to damage the hardware. A cloth dampened with solvent or green Scotch-Brite® pads may be used to remove the corrosion. Corrosion removal is to be done in a circumferential direction only.

Notes / Comments NONE

Preliminary PFAR(s)? ____ Yes __X__ No Preliminary PFAR Number(s): N/A

Clarification Form(s)? ____ Yes __X__ No Clarification Form Page No.(s): N/A

POSTFLIGHT OBSERVATION RECORD (PFOR) B-9

Case Factory Joint Condition

Motor No.: 360L029	Side: Right (B)	Date: 09-03-93
Assessment Engineer(s)/Inspector(s): ERIC HAY		
Factory Joint: Aft Center		

Case Factory Joint Observations:

	Yes	No	Comment #
A. Heat Affected or Eroded Joint O-ring?		✓	
B. Heavy Corrosion in Joint?		✓	
C. Heavy Corrosion in Leak Check Port?		✓	

Note: Heavy corrosion is defined as corrosion that causes pitting. It may be necessary to remove corrosion to determine if pitting has occurred; however, care should be taken not to damage the hardware. A cloth dampened with solvent or green Scotch-Brite® pads may be used to remove the corrosion. Corrosion removal is to be done in a circumferential direction only.

Notes / Comments

NONE

Preliminary PFAR(s)? ____ Yes ✓ No Preliminary PFAR Number(s): ____

Clarification Form(s)? ____ Yes ✓ No Clarification Form Page No.(s): ____

POSTFLIGHT OBSERVATION RECORD (PFOR) B-9

Case Factory Joint Condition

Motor No.: 360L029	Side: Right (B)	Date: 5-12-93
Assessment Engineer(s)/Inspector(s): H. ZAREMBA		
Factory Joint: ET Attach/Stiffener		

Case Factory Joint Observations:	Yes	No	Comment #
A. Heat Affected or Eroded Joint O-ring?		✓	
B. Heavy Corrosion in Joint?		✓	
C. Heavy Corrosion in Leak Check Port?		✓	

Note: Heavy corrosion is defined as corrosion that causes pitting. It may be necessary to remove corrosion to determine if pitting has occurred; however, care should be taken not to damage the hardware. A cloth dampened with solvent or green Scotch-Brite® pads may be used to remove the corrosion. Corrosion removal is to be done in a circumferential direction only.

Notes / Comments

Preliminary PFAR(s)? _____ Yes ✓ No Preliminary PFAR Number(s): _____

Clarification Form(s)? _____ Yes ✓ No Clarification Form Page No.(s): _____

POSTFLIGHT OBSERVATION RECORD (PFOR) B-9

Case Factory Joint Condition

Motor No.: 360L029	Side: Right (B)	Date: 5-12-93

Assessment Engineer(s)/Inspector(s): H. ZAREMBA

Factory Joint: Stiffener/Stiffener

Case Factory Joint Observations:	Yes	No	Comment #
A. Heat Affected or Eroded Joint O-ring?		✓	
B. Heavy Corrosion in Joint?		✓	
C. Heavy Corrosion in Leak Check Port?		✓	

Note: Heavy corrosion is defined as corrosion that causes pitting. It may be necessary to remove corrosion to determine if pitting has occurred; however, care should be taken not to damage the hardware. A cloth dampened with solvent or green Scotch-Brite® pads may be used to remove the corrosion. Corrosion removal is to be done in a circumferential direction only.

Notes / Comments

Preliminary PFAR(s)? _____ Yes ✓ No Preliminary PFAR Number(s): _____

Clarification Form(s)? _____ Yes ✓ No Clarification Form Page No.(s): _____

POSTFLIGHT OBSERVATION RECORD (PFOR) B-9

Case Factory Joint Condition

Motor No.: 360L029	Side: Right (B)	Date: 5-10-93
Assessment Engineer(s)/Inspector(s): GARY ASPER (QA)		
Factory Joint: Aft Dome		

Case Factory Joint Observations:	Yes	No	Comment #
A. Heat Affected or Eroded Joint O-ring?		✓	N/A
B. Heavy Corrosion in Joint?		✓	
C. Heavy Corrosion in Leak Check Port?		✓	A

Note: Heavy corrosion is defined as corrosion that causes pitting. It may be necessary to remove corrosion to determine if pitting has occurred; however, care should be taken not to damage the hardware. A cloth dampened with solvent or green Scotch-Brite® pads may be used to remove the corrosion. Corrosion removal is to be done in a circumferential direction only.

Notes / Comments

N/A

minary PFAR(s)? _____ Yes ✓ No Preliminary PFAR Number(s): N/A

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Author(s): _____

Originating NASA Organization: MSFC

Performing Organization (if different) Thiokol

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